An overview of urinary incontinence

Bardsley, A.

Overview of Urinary Incontinence

Abstract

Urinary incontinence is a common problem that is often under-reported due to the embarrassing nature and social stigma attached. Urinary incontinence can have a considerable effect on an individual's quality of life, but can be significantly improved with correct assessment, treatment and management. Conservative treatment options including: pelvic floor exercises, bladder retraining and fluid modification are recommended before referral to secondary services. This article provides an overview of the main types of urinary incontinence, and summarises recent guidelines for the assessment, diagnosis and effective conservative treatment options for them and when a referral for specialist care is required.

Key words: Urinary Incontinence, Urge Incontinence, Overactive Bladder Syndrome, Stress Incontinence, Overflow Incontinence, Assessment, Treatment.

Author: Alison Bardsley, RGN, MSc, Dip DN, PGcert HE

Title: Senior Lecturer, Course Director Non-Medical Prescribing

Contact details: Richard Crossman RM315, Coventry University, Jordan Well, Coventry, CV1 5FB

E-mail aa8538@coventry.ac.uk

Phone: 0247765 5880

Introduction

Urinary incontinence is a common problem that affects between 3 and 6 million people in the UK (Irwin et al, 2005 and Buckley and Lapitan, 2009). Urinary incontinence is more common in women than men, with prevalence increasing with age (Price and Currie, 2010). The impact of urinary incontinence on quality of life is well recognised (Tang et al 2014, Minassian et al, 2015). Many people do not seek help due to the embarrassing nature and social stigma attached (Berman, Berman and Felder, 2003). Following publication of the Francis report (Department of Health (DoH), 2010) and a national audit of continence care (Healthcare Quality Improvement Partnership (HQIP) & Royal College of Physicians (RCP) 2010, pg 6), it was recommended that healthcare professionals should pro-actively ask individuals about symptoms of bladder incontinence to identify those who have a problem. There has been evidence in the past of nurses resorting to containment of incontinence without proper assessment and treatment (Booth et al 2009 and Ostaszkiewicz., O'Connell, Millar, 2008). The National Institute for Health and Care Excellence (NICE) guidelines (2015a and 2015b) state that absorbent products and other aids should not be used as a treatment option, but can be used alongside treatment for urinary incontinence where all treatment options have been explored. Healthcare professionals should be able to provide an initial assessment and provide conservative treatment and also understand when to refer to a specialist. The NICE guidelines for Urinary Incontinence in women: management (NICE, 2015a) and Lower urinary tract symptoms in men: management (NICE, 2015b) recommend initial conservative treatments including

lifestyle advice, pelvic floor exercises, bladder retraining and pharmacological options, before referral for secondary treatment such as surgery is considered.

Urinary incontinence is defined by the International Continence Society (Staskin et al, 2009 and Abrams et al, 2002) as “a storage symptom and defined as the complaint of any involuntary loss of urine, where the loss of urine is a social or hygienic problem”.

The main types on incontinence are:

- Stress urinary incontinence – the involuntary leakage of urine on effort or exertion (such as sneezing or coughing), which raises the intra-abdominal presssure to that higher than the pelvic floor and bladder sphincter pressures. Stress incontinence is more common in women and is associated with pregnancy, childbirth, constipation and obesity. Stress incontinence is characteristically associated with small leakages and the leakage is momentary and ceases once the episode of raised intra-abdominal pressure stops.
- Urge incontinence – involuntary leakage accompanied by, or imediately preceded by, a sudden powerful desire to void which cannot or is difficult to defer (urgency). Urge urinary incontinence is part of a larger symptom complex known as overactive bladder syndrome (OAB).

  OAB is defined as urinary urgency which occurs with or without incontinence. Where incontinence occurs with OAB it is classsed as “OAB wet” and where there is no incontinence this is known as “OAB dry”. OAB is associated with increased voiding frequency and nocturia. Frequency is defined by the ICS as voiding > 7 times in 24 hours. These symptoms are suggestive of detrusor overactivity but can result from urinary retention and other forms of urethrovescical dysfunction.

- Mixed urinary incontinence – is where involuntary leakage is associated with urgency and stress incontinence
- Overflow incontinence occurs as a complication of urinary retention. When a person cannot empty their bladder completely and it becomes over-distended this can result in continuous, or frequent loss of urine. Urinary retention can be the result of pelvic/abdominal surgery, enlarged prostate, constipation, pregnancy, prolapse, medication and neurological impairment. Patients with overflow incontinence often experience urinary uregncy and frequency, small voided volumes, urinary hesitancy, a poor or diminished urine flow rate and nocturia.
- Nocturnal enuresis is the involuntary leakage of urine at night and can be associated with OAB, medication and sleep apnoea.

- Reflex incontinence is urinary leakage due to neurological damage, disease or a congenital abnormailty that results in failure of the bladder to store urine, to empty, or a combination of both. Reflex incontinence is associated with urgency, urge

incontinence and frequency, incomplete bladder emptying, urinary tract infections and loss of full bladder contents, but can vary.

- Functional incontinence, has no organic cause and is associated with cognitive or physical factors that impair the persons ability to reach or use the toilet effectively. Functional incontinence is associated with impaired mobility, dexterity, dementia/cognitive impairment, confusion, poor eyesight, poor environment/change in environment and hospitalisation or institutionalism.

(Definitions taken from National Institute for Health and Clinical Excellence (NICE) , 2015a and 2015b, Abrams et al, 2002 and NICE, 2012)

Prevalence

The reported prevalence of urinary incontinence varies between 5-69% in women (Hunskaar et al, 2005) and 11-34% in men (Markland, et al. 2010) and increases increasing with age (Buckley and Lapitan, 2009). In the UK approxiametley 24% of older people are affected by urinary incontinence, with rates for those in institutioanl care between 30-60% (Hunskaar et al, 2004). Prevalence varies due to differing definitions, the popluation studied and measurements used (NICE, 2015a and NICE, 2015b).

Incontinence is probably significantly under-reported due to the embarrassing nature of the problem and the social stigma and taboo that remains, with many people waiting a significant length of time before seeking help (Strickland, 2014, NICE 2015a, Porrett, 2010 and Wennberg et al, 2009). Help seeking behaviour is affected by a number of issues including an individuals experience of incontinence (how much it bothers them), a percepotion that incontinence is an inevitable and normal part of ageing, lack of services or a lack of awareness of available services and knowledge of available treatments (Strickland, 2014 and Wennberg et al, 2009).

The main risk factors for devloping urinary incontinence are:

- Damage during childbirth
- Neurological conditions which affect the brain or spoinal cord such as, Stroke, Multiple Sclerosis and Parkinsons disease
- Obesity
- Damage due to surgery nearby or on the bladder, this can damage the nerves or the connective tissues.
- Urinary tract infection
- Certain medications
- Congentital such as cerebral palsy
- Constipation
- Fluid intake – drinking too much alcohol or caffeine or poor fluid intake (can cause strong concentrated urine which can irritate the bladder and cause urgency and frequency

- Physical disabilities that reduce mobility and dexterity.

(NICE 2015a and NICE, 2015b)

Normal bladder function

The bladder has two main functions: to store and expel urine. Remaining continent requires a complex interaction between detrusor muscle activity (contractions) and urethral sphincter closure pressure controlled by the nervous system. The bladder is innervated by the parasympathetic, sympathetic and somatic nervous systems which are controlled by the higher cortical and subcortical centers (Ouslander, 2004). In bladder storage, the urethral closure pressure needs to exceed the pressure from detrusor (bladder muscle) contractions. Any increases in intra-abdominal pressure are transmitted to the urethra and bladder equally, resulting in continence. Normal voiding is achieved when urethral pressure falls and bladder pressure rises (Getliffe and Dolman, 2007). Problems with this mechanism and the muscles can lead to incontinence.

Receptors and neurotransmitters

Many medication therapies for urinary incontinence are based on targeting the neurotransmitters required for voiding and maintaining urethral closure pressure. Coordination of voiding involves four principle neurotransmitters: glutamate, serotonin, noradrenaline and acetylcholine. The primary neurotransmitter in the parasympathetic neurons and somatic nerves is acetylcholine, noradrenaline is used in sympathetic neurons (de Groat., Griffiths and Yoshimura, 2015, Abrams et al, 2010 and Fowler., Griffiths and de Groat, 2008).

Assessment

A holistic and patient centered assessment is required to establish the presence and nature of bladder dysfunction and any contributory factors. An initial assessment should include a comprehensive symptom history, a focused physical examination (where required and appropriate) and laboratory testing such as urinalysis and blood tests in order to establish a working diagnosis and to exclude underlying organ specific related or unrelated conditions that may require attention (Staskin et al. 2009, NICE, 2015a and NICE, 2015b). Lower urinary tract symptoms are defined from the individual's perspective, although they cannot provide a definitive diagnosis, conservative treatment can be instigated based on the initial assessment (Staskin et al. 2009, NICE, 2015a and NICE, 2015b).
Health care professionals must be alert for any 'red flags' that might indicate a serious underlying condition (see the NICE guidelines NG12, 2015c). Referral should be made where any "red flags" are present. Healthcare professionals should consider referral to a continence service or consultant specialist where initial treatment/management has been unsuccessful or further tests are required. Table 1 includes the main "red flags" for prostate, bladder and renal cancer.

Table 1 "Red Flags"– referral for patients using a suspected cancer pathway referral (taken from NICE guidelines NG12, 2015c)

Prostate Cancer	Consider a prostate-specific antigen (PSA) test and digital rectal examination to assess for prostate cancer in men with: • any lower urinary tract symptoms, such as nocturia, urinary frequency, hesitancy, urgency or retention **or** • erectile dysfunction **or** • visible haematuria. • PSA levels are above the age-specific reference range Refer men if their prostate feels malignant on digital rectal examination.
Bladder Cancer	Refer people if they are aged 45 and over and have: ○ unexplained visible haematuria without urinary tract infection **or** ○ visible haematuria that persists or recurs after successful treatment of urinary tract infection, **or** • aged 60 and over and have unexplained non-visible haematuria **and** either dysuria or a raised white cell count on a blood test.
Renal Cancer	Refer people if they are aged 45 and over and have: • unexplained visible haematuria without urinary tract infection **or** • visible haematuria that persists or recurs after successful treatment of urinary tract infection

A bladder diary is important to record the patient's day to day bladder habits. A bladder diary records diurnal and nocturnal patterns of voiding, functional and maximum bladder capacity, fluid intake and any circumstances associated with leakage. Bladder diaries should be kept for a minimum of 3 days and cover the persons usual activities such as working and leisure days (NICE, 2015a). The fluid balance chart establishes patterns and type of fluid intake. The types of fluid taken is important especially those that may irritate the bladder such as caffeinated, carbonated or citrus drinks (Miller et al, 2016, Lohsiriwat., Hirunsai and Chaiyaprasithi, 2011 and Maserejian et al, 2013).

A holistic assessment needs to include the person's desire for treatment, as this can be affected by previous experiences, personal values, motivation, expectations, mental/cognitive status, environment and physical status. Healthcare professionals as well as the person and/or their family may have an expectation of incontinence which may vary according to the patient's age, for example people often believe that urinary incontinence is an inevitable part of aging (Martin., Williams and O'Neil, 2009). The assessment should also build up a picture of the person (such as the person's family network/relationships, social activities, hobbies and employment history). Bladder dysfunction can have a negative impact on a person's perception of themselves and their body image, using a validated incontinence-specific Quality of Life (QOL) score for example the International Consultation on Incontinence Questionnaire (ICIQ), Bristol Female Lower Urinary Tract Symptoms questionnaire (BFLUTS) and Stress and Urge Incontinence and Quality-of-Life Questionnaire (SUIQQ) (Staskin et al. 2009, NICE, 2015a and NICE, 2015b) can help determine how the bladder dysfunction is affecting them individually.

- **Co-morbidities**

Consider any significant past medical, surgical, obstetric or genitourinary history. Any condition that may affect functioning of the kidneys and urine production, the function of the pelvic floor and genitourinary tract. Some examples of conditions to specifically consider are:

  - Diabetes mellitus can increase urine production and decrease bladder sensation due to peripheral neuropathy resulting in urgency and frequency, which may lead to incontinence if mobility and dexterity are also impaired (Burakgazi et al, 2012).
  - Heart disease can cause fluid retention and impaired renal function and as drug treatment increases urine output, frequency is common (Tannenbaum, and Johnell, 2014).
  - Arthritis is associated with impaired mobility and dexterity and can lead to functional incontinence (Turner-Stokes and Frank, 1992).
  - Multiple births/large babies may damage pelvic floor and cause stress urinary incontinence (NICE, 2015a).

- Neurological conditions, which affect the brain and spinal cord, such as Parkinson's disease or multiple sclerosis (NICE, 2012)
- Obesity increases the pressure placed on the pelvic floor and pelvic organs (Subak., Richter and Hunskaar, 2009).

- **Physical examination**

This should only be carried out by a trained competent professionals and according to local policy, and should include:

- Bladder palpation to identify retention – this should also be assessed using a bladder scanner or in/out catheter) (NICE, 2015a and 2015b)
- Abdominal examination for masses (NICE, 2015a and 2015b)
- Vaginal examination to identify atrophic vaginitis, pelvic organ prolapse and the strength and condition of the pelvic floor. Female patients should also be asked about bladder leakage during intercourse is also an important symptom to ascertain as it can provide a clue to the underlying pathology (NICE, 2015a).
- Male patients should be offered an examination of the external genitalia and a digital rectal examination and prostate specific antigen (PSA) if their symptoms are suggestive of bladder outlet obstruction secondary to prostate enlergement (NICE, 2015b).

- **Investigations**

- Urinalysis to eliminate UTI, check for hydration (specific gravity) and diabetes
- Post void residual urine measurement (bladder scanner or in/out catheter) to identify any incomplete bladder emptying and urinary retention. It is also important to drain any residual urine with an in/out catheter and then re-scan the bladder after allowing to re-fill to decide whether the residual is a one off, or recurring problem.

- **Medication**

A comprehensive medication history should include prescribed, over the counter and herbal medicines as well as recreational drugs and illegal/illicit drugs. Ketamine use has been associated with symptoms including severe pain, frequency, haematuria and dysuria (Tsai and Kuo, 2015). The use of some psychoactive substances, mainly stimulants such as MDMA and amphetamine are associated with urinary retention (Skeldon and Goldenberg, 2014 and Selius and Subedi, 2008).

It is important to consider a patient's drug history, particularly in new onset incontinence and in the elderly, where polypharmacy is common (Duerden., Avery and Payne, 2013). Healthcare professionals should review the use of any medication and/or its side-effects

that increases urine production, sedates, impairs cognition, affects sensation and muscle tone. Drugs that are commonly associated with urinary incontinence include sedative-hypnotics, diuretics, anticholinergics, antispasmodics, analgesics, antihistamines, anti-psychotics, alpha-adrenergic agonists, alpha-antagonists, calcium channel blockers, ACE inhibitors, and antiparkinsonian medications (Porter and Kaplan, 2011 and Tsakiris., Oelke and Michel, 2008 and British Medical Association (BMA) and the Royal Pharmaceutical Society (RPS), 2016).

Depending upon the drugs mode of action, the effect may be direct or indirect and can lead to any of the types of incontinence. Drugs including those with anticholinergic properties or side effects, antidepressants, COX-2 inhibitors, antihistamines and opioids can result in chronic urinary retention can lead to overflow incontinence (Selius and Subedi, 2008 and BMA and RPS, 2016).

Treatment options

The options for treatment depend on the type of symptoms and underlying pathology. The initial treatment for all patients should include:

- Adjustment and modification of fluid intake; i.e. if it is too high or too low and caffeine restriction (Lohsiriwat, Hirunsai and Chaiyaprasithi, 2011 and Maserejian et al., 2013).
- Treatment of constipation
- Advice to stop smoking
- Advice about weight loss if their BMI is over 30 (Lucas et al 2015)
- Bladder retraining including time delayed voiding.
- Pelvic floor training
- Pharmacological therapy.

(NICE, 2015a and NICE 2015b)

Before using pharmacological therapies, fluid modification, bladder retraining and pelvic floor retraining should be tried. Secondary options include botox® injection into the bladder lining and surgery. Conservative therapies have been proven to be effective strategies and in motivated patients can be more effective than medication (NICE, 2015a).

Health professionals should be able to inform patients of all the options available to them for the treatment and management of their condition to ensure that patients have the opportunity to make informed decisions (NICE, 2015a and NICE, 2015b). Treatment and care should respect the patient's individual needs and preferences. Professionals should form a partnership with patients enabling them to make informed decisions and choices. This also aids in improving concordance and reducing medication waste (NICE, 2009).

Treatment options for Stress incontinence

Pelvic Floor exercises remain the first line treatment option for stress incontinence, with a programme that comprises at least 8 contractions performed 3 times per day (NICE, 2015a).

Duloxetine remains the only drug currently licensed for the treatment of SUI (BMA and RPS, 2016). Duloxetine is a serotonin and noradrenaline reuptake inhibitor that acts mainly in the spinal cord to increase pudendal nerve activity, which increases urethral sphincter closure pressure within the storage phase (NICE, 2015a). Duloxetine is associated with a high incidence of adverse effects which include nausea, dry mouth and constipation, as such it also has a high discontinuation rate (NICE, 2015a). NICE (2015a) recommend Duloxetine as a second line therapy for women only if surgery is declined or unsuitable.

For older women intravaginal oestrogen therapy can provide some improvement in the symptoms of UI especially in post-menopausal women with vaginal atrophy (Panay et al, 2013 and NICE, 2015a). Intravaginal oestrogen has an effect on the bladder and urethral epithelium and can help to relieve symptoms of urinary frequency, urgency and possibly reduce recurrent urinary tract infections (Panay et al, 2013).

Treatment options for Urge incontinence

Drugs with an antimuscarinic or anticholinergic action remain the mainstay for the treatment and management of overactive bladder (NICE, 2015a and NICE, 2015b). Anticholinergic medications inhibit the binding of acetycholine on the muscarinic receptors within the detrusor. This decreases bladder (detrusor) contractions without inhibiting normal voiding, thus the ability of the bladder to store urine is increased and the frequency and urgency symptoms are reduced. The action and metabolism of the different anticholinergic medications varies depending on the affinity to a particular muscarinic or nicotinic receptor. Anticholinergic medications are associated with common adverse side effects such as constipation, dry mouth, blurred vision and somnolence. More serious side effects include cardiac and cognitive events (Robinson and Cardozo, 2012).

Older patients are more susceptable to central nervous system effects, which include cognitive disturbances such as sedation, inability ot concentrate, memory impairment and delirium. This high rate of adverse effects is associated with poor concordance, with a reported discontinuation rate between 43-83% (Sexton et al, 2011).

As anticholinergic drugs undergo hepatic metabolism involving cytochrome P450 isoenzymes (in particular CYP3A4 and CYP2D6) and renal excretion, care should be taken in patients with renal or hepatic impairment. There is also a risk of postural hypertension. Concommittant use of other medications with anticholinergic properties such as antihistamines, may increase the risk of side effects (Robinson and Cardozo, 2012). As a result of the increased adverse effect lower doses should always be considered in older patients. Tropsium chloride has no selectivity for muscarinic receptor subtypes. It is not metabolised by the cytochrome P450 system, and is expected to cross the blood-brain barrier only to a limited extent, which results in fewer negative cognitive side effects, which can make it a useful choice in older patients (Widemann, Fusgen and Hauri, 2001).

There are a number of different anticholinergic drugs licensed for OAB treatment within the UK. NICE (2015a) recommends that: oxybutynin (immediate release, IR), tolterodine (immediate release, IR) or darifenacin modified release (MR) (once daily preparation) are the first choices for OAB or mixed UI.

If the first treatment for OAB or mixed UI is not effective or well-tolerated, another drug with the lowest acquisition cost should be offered (NICE, 2015a). Second line antimuscarinic drugs include fesoterodine, tropsium chloride and popiverine.

Mirabegron is a $ß_3$-adrenoceptor agonist, which activates beta-3-adrenoceptors causing the bladder to relax, which helps it to fill and store urine. It has a lower place in therapy and relatively weak evidence due to limited comparative data with other anti-muscarinics and limited long- term efficacy data. NICE (2015a) recomends mirabegron as an option for treating people for whom antimuscarinic drugs are contra-indicated, clinically ineffective or they have experienced unacceptable side effects.

Botulinum toxin

First line invasive intervention for OAB in men and women is multiple injections of Botulinum toxin (type A) directly into the bladder detrusor muscle every 6-12 months (NICE, 2015a and NICE 2015b). Botulinum toxin (type A) is a neurotoxin that inhibits the release of acetylcholine from the presynaptic cholinergic nerve ending, which decreases the muscle contractibility owing to localized chemical denervation (Nitti et al; EMBARK Study Group, 2013 and Andersson et al, 2009). Botulinum toxin type A has been shown to reduce urinary symptoms of OAB by 35-50% compared with placebo (NICE, 2015a). One of the main side effects is that the toxin can paralyse the bladder, leading to large residual urine volumes. Around 20% of patients will need to perform self catheterisation, therefore all women who are offered bbotulinum toxin injections must be willing and able to undertake self-catheterisation prior to the procedure (NICE, 2015a).

Treatment Mixed urinary incontinence

NICE (2015a and NICE 2015b) recommend that bladder and pelvic floor re-training should be offered to women and men with mixed UI for a minimum of 3 months, as first line treatment. If following a 3 month period symptoms have failed to resolve then drug therapy may be initiated. However, bladder re-training and the non-pharmacological methods should continue alongside any drug treatment.

Treatment of Nocturnal Enuresis (Nocturia and Nocturnal polyuria)

Desmopressin is a synthetic analogue of vasopressin or antidiuretic hormone, which inhibits diuresis, while avoiding vasopressive effects (NICE, 2015a and BMA and RPS, 2016). When given at night it reduces nocturnal urine production (nocturia). NICE (2015) recommend desmopressin, may be considered specifically to reduce bothersome symptoms of UI or OAB at night. However the prescribing of desmopressin should be avoided in patients over 65 years with cardiovascular disease or hypertension (NICE, 2015a). Serum sodium should be measured 3 days after the first dose. If serum sodium is reduced to below the normal

range, the desmopressin treatment should be stopped (BMA and RPS, 2016). An alternative is to use a late afternoon loop diuretic for patients with nocturnal polyuria (NICE, 2015a).

Management of Benign Prostate Hyperplasia

For men an enlarged prostate can block the urethra causing urinary retention which leads to symptoms of frequency and urgency, nocturia and overflow incontinence (NICE, 2015b). Within the male bladder neck and prostate, smooth-muscle tension is mediated by alpha-1-adrenergic receptors. Alpha-adrenergic receptor–blocking agents decrease the resistance along the bladder neck, prostate, and urethra by relaxing the smooth muscle and allowing passage of urine. NICE (2015b) recommend that male patients with moderate to severe lower urinary tract symptoms (LUTS) are offered an alpha blocker (e.g. alfuzosin, doxazosin, tamsulosin or terazosin). A combination of an alpha blocker and a 5-alpha reductase inhibitor should be offered to men with bothersome moderate to severe LUTS and prostates estimated to be larger than 30 g or a PSA level greater than 1.4 ng/ml. Where symptoms are still present an anticholinergic should be considered in combination with an alpha blocker to men who still have storage symptoms.

Conclusion

The causes of urinary incontinence are varied and can be mutifactorial. Urinay incontinence is an under-reported problem that increases with age, and at all ages is more common in women than men. Healthcare professionals should be pro-active in asking patients about symptoms of urinary incontinence. Patients with urinary incontinence should undergo a comprehensive and holistic assessment of their symptoms and the effect on their quality of life a physical examination and urinalysis. Sucessful treatment must be tailored to the specific type of dysfunction and incontinence symptoms experienced by an individual.

Reflective questions

From reading this article:

1. In the area where you work – which patuents are most likely to have or be at risk of urinary inconitnnece?
2. What implications does this article/information have for your future practice?
3. What other facts or issues do you feel are/were relevant to the information presented?
4. What are some ways you could share this learning/information with your colleagues?

References:

Abrams P., Cardozo L., Fall M., Griffiths D., Rossier P., Ulmsten U., Van Kerrebroeck PE., Victor A and Wein A. (2002). The standardisation of terminology in lower urinary tract function: a report from the standardisation sub-comittee of the International Continence Society. *Urology,* Volume 61, pp. 37-49.

Abrams, P., Andersson, K.E., Birder, L., Brubaker, L., Cardozo, L., Chapple, C., Cottenden, A., Davila, W., de Ridder, D., Dmochowski, R.,Drake, M., DuBeau, C., Fry, C,. Hanno, M., Hay Smith, J.,Herschorn, S.,Hosker, G., Kelleher,C., Koelbl,H., Khoury, S (2010). *4th International Consultation on Incontinence: Recomendations of the International Scientific Committee: Evalation and Treatment of Urinary Incontinence, Pelvic Organ Prolapse and Faecal Incontinence,* Paris: International Continence Society.

Andersson KE., Chapple CR., Cardozo L., Cruz F., Hashim H., Michel MC., Tannenbaum C, and Wein AJ. (2009). Pharmacological Treatment of Urinary Incontinence. In: C. L. K. S. a. W. W. Abrams P., ed. *Incontinence. 4th International Consultation on Incontinence.* Paris: Health Publications Ltd, pp. 631-700.

Berman, L., Berman, J and Felder, S. (2003). Seeking help for sexual function complaints: What gynecologists need to know about the female patient's experience.. *Fertil Steril. ,* Volume 79, pp. 572-576.

Booth, J., Kumlien, S., Zang, Y., Gustafsson, B and Tolson, D. (2009). Rehabilitation nurses practices in relation to urinary incontinence following stroke: a cross-cultural comparison. *Journal Of Clinical Nursing ,* 18(7), pp. 1049-1058.

British Medical Association and the Royal Pharmaceutical Society, March. (2016). *Nurse Prescribers Formulary for Community Practitioners.* London: British Medical Association and the Royal Pharmaceutical Society.

Buckley, BS and Lapitan, MCM. (2009). Prevalence of Urinary Incontinence in Men, Women and Children-Current Evidence: Findings of the Fourth International Consultation on Incontinence. *Journl of Urology,* 76(2), p. 265–270.

Burakgazi, AZ.,, Alsowaity, B., Burakgazi, ZA., Unal, D and Kelly, JJ. (2012). Bladder dysfunction in peripheral neuropathies.. *Muscle Nerve,* 45(1), pp. 2-8.

de Groat, WC., Griffiths, D and Yoshimura, N. (2015). Neural Control of the Lower Urinary Tract. *Compr Physiol.,* 5(1), pp. 327-396.

Department of Health. (2010). *Independent inquiry into care provided by Mid Staffordshire NHS Foundation Trust January 2005 – March 2009, Volume 1, Chaired by Robert Francis QC,* London: Department of Health.

Duerden, M., Avery, T and Payne, R. (2013). *Polypharmacy and medicines optimisation,* London: The King's Fund .

Fowler, CJ., Griffiths, D and de Groat, WC. (2008). The neural control of micturition. *National Review of Neuroscience,* 9(6), pp. 453-466.

Getliffe, C and Dolman, M. (2007). *Promoting Continence: A Clinical and Research Resource.* 3rd ed. London: Elsvier (Churchill Livingstone).

Healthcare Quality Improvement Partnership (HQIP) & Royal College of Physicians. (2010). *National Audit of Continence Care: Combined Organisational and Clinical Report.,* London: Healthcare Quality Improvement Partnership (HQIP) & Royal College of Physicians.

Hunskaar, S., Burgio, K., Clark, A., Lapitan, MC., Nelson, R., Sillen, U and Thom, D. (2005). *Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP).,* Paris: Woirld Health Organisation and International Continence Society .

Hunskaar, S., Lose, G., Sykes, D., Voss, S. (2004). The prevalence of urinary incontinence in women in four European countries. *BJU international,* 93(3), pp. 324-30.

Irwin, DE., Milsom, I., Kopp, Z., Abrams, P and Cardozo. L. (2005). Impcat of overactive bladder symptoms on employment, social interactions and emotional wellbeing in six European countries.. *British Journal of Urology,* Volume 97, pp. 96-100.

Lohsiriwat, S., Hirunsai, M and Chaiyaprasithi, B. (2011). Effect of caffeine on bladder function in patients with overactive bladder symptoms.. *Urology Annals,* 3(1), pp. 14-18.

Lucas,MG. Bedretdinova,D. Berghmans,LC. Bosch, JH.,Burkhard,FC. Cruz,F. Nambiar,AK. Nilsson,CG, Tubaro, A and Pickard, RS. (2015). *EAU Guidelines on Urinary Incontinence,* s.l.: European Association of Urology (EAU).

Markland, AD., Goode, PS., Redden, DT., Borrud, LG and Burgio, KL. (2010). Prevalence of Urinary Incontinence in Men: Results from the National Health and Examination survey. *The Journal of Urology,* 184(3), pp. 1022-1027.

Martin, C., Williams, C and O'Neil, D. (2009). Retrospective analysis of attitudes to ageing in the Econimist: apocalyptic demography for opinion formers?. *British Medical Journal,* Volume 339, pp. 1435-7.

Maserejian, NN., Wager, CG., E Giovannucci, EL., Curto, TM., McVary, KT and McKinlay, JB. (2013). Intake of Caffeinated, Carbonated, or Citrus Beverage Types and Ddevelopment of Lower Urinary Tract Symptoms in Men and Women.. *American Journal of Epidemiology.,* 177(12), pp. 1399-1410.

Miller, JM., Garcia, CE., Hortsch, SB., Guo, Y and Schimpf, MO. (2016). Does Instruction to Elliminate Coffee, Tea, Alcohol, Carbonated, and Artificially Sweetened Beverages Improve Lower Urinary Tract Symptoms?: A Prospective Trial.. *Journal of Wound Ostomy Continence Nursing.,* 43(1), pp. 69-79.

Minassian, VA., Sun, H., Yan, XS., Clarke, DN and Stewart, WF. (2015). The interaction of stress and urgency urinary incontinence and its effect on quality of life.. *International Urogynecology Journal ,* 26(2), pp. 269-276.

National Institue for Health and Care Excellence (NICE). (2015a). *Urinary Incontinence in Women: management. NICE guidekine CG171.,* London: National Institue for Health and Care Excellence.

National Institute for Health and Care Excellence (NICE). (2015b) . *Lower urinary tract symptoms: management. NICE clinical guideline CG97,* London: National Institute for Health and Care Excellence (NICE).

National Institute for Health and Care Excellence. (2009). *NICE clinical guideline 76: medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence,* London: National Institute for Health and Care Excellence.

National Institute for Health and Care Excellence (2012). *Urinary incontinence in neurological disease: Management of lower urinary tract dysfunction in neurological disease,* London: NICE.

National Institute for Health and Care Excellence (2015c). *Suspected cancer: recognition and referral. (NICE guidelines NG12),* London: National Institute for Health and Care Excellence.

Nitti VW1, Dmochowski R, Herschorn S, Sand P, Thompson C, Nardo C, Yan X, Haag-Molkenteller C; EMBARK Study Group. (2013). OnabotulinumtoxinA for the treatment of patients with overactive

bladder and urinary incontinence: results of a phase 3, randomized, placebo controlled trial.. *Journal of Urology,* 189(6), pp. 2186-93.

Ostaszkiewicz J1, O'Connell B, Millar L. (2008). Incontinence: managed or mismanaged in hospital settings?. *International Journal of Nursing Practice,* 14(6), pp. 494-502.

Ouslander, J. (2004). Management of overactive bladder. *New England Journal of Medicine,* 350(8), pp. 786-799.

Panay, N., Hamoda, H., Arya, R and Savvas, M. (2013). The 2013 British Menopause Society and Womens' Health Concern recomendations on hormone replacement therapy. *Menopause International,* 19(2), pp. 59-68.

Porrett, T. (2010). *Coping and help seeking behaviour in women with Pelvic Floor Dysfunction - the emic perspective.* London: City University, London.

Porter, MD and Kaplan, KKL. (2011). *The Merck Manual of Diagnosis and Therapy.* 19th ed. USA: Merck Sharp and Dohme Corp.

Price, N and Currie, I. (2010). Urinary incontinence in women: diagnosis and management.. *Practitioner. ,* 254(1727), pp. 27-32.

Robinson, D and Cardozo, L. (2012). Antimuscarinic drugs to treat overactive bladder. *BMJ,* Volume 344.

Selius, BA and Subedi, R. (2008). Urinary Retention in Adults: Diagnosis and Initial Management. *Am Fam Physician,* 77(5), pp. 643-650.

Sexton, CC., Nottle, SM., Maroulis, C., Dmochowski, RR., Cardozo, L and Subramanian, D. (2011). Persistance and adherance in the treatment of overactive bladder syndrome with anticholinergic therapy: a systematic review of the literature. *International Journal of Clinical Practice,* 65(5), pp. 567-85.

Skeldon, SC and Goldenberg, SL. (2014). Urological complications of illicit drug use. *Nature Reviews Urology.,* Volume 11, pp. 169-177.

Staskin, D.. Kelleher, C... Bosch, R., Coyne, K., Cotterill, N., Emmanuel, A,. Yoshida, M and Kopp, Z. (2009). Initial Assessment of Urinary and Faecal Incontinence in Adult Male and Female Patients. In: C. L. a. W. A. a. K. S. Abrams, ed. *Incontinence: 4th International Consultation on Incontinence..* Paris: International Continence Society, pp. 332 - 403.

Strickland, R. (2014). Reasons for Not Seeking Care for Urinary Incontinence in Older Community-Dwelling Women: A Contemporary review. *Urologic Nursing,* 34(2), pp. 63-94.

Subak, LL., Richter, HE and Hunskaar, S. (2009). Obesity and Urinary Incontinence: Epidemiology and Clinical Research Update.. *Journal of Urology,* 182(Supplement 6), pp. S2-7.

Tang, DH., Colayco, DC., Khalaf, KM., Piercy, J., Patel, V., Globe, D and Ginsberg, D. (2014). Impact of urinary incontinence on healthcare resource utilization, health-related quality of life and productivity in patients with overactive bladder. *BJU International ,* Volume 113, pp. 484-491.

34. Tannenbaum, C and Johnell, K. (2014). Managing Therapeutic Competition in Patients with Heart Failure, Lower Urinary Tract Symptoms and Incontinence. *Drugs Aging,* 31(2), pp. 93-101.

Tsai, YC and Kuo HC. (2015). Ketamine cystitis: Its urological impact and management.. *Urological Science,* 26(3), pp. 153-157.

Tsakiris, P., Oelke, M and Michel, MC. (2008). Drug-induced urinary incontinence.. *Drugs Aging. ,* Volume 25, pp. 541-549.

35. Turner-Stokes, L and Frank, AO. (1992). Urinary incontinence among patients with arthritis- a neglected disability.. *J R Soc Med,* Volume 85, pp. 389-93.

Wennberg, AL., Molander, U., Fall, M., Edlund, C., Peeker, R and Milsom, I. (2009). Lower urinary tract symptoms: lack of change in prevalence and help-seeking behaviour in two population-based surveys of women in 1991 and 2007. *British Journal of Urology ((International),* Volume 104, pp. 954-959.

Widemann, A., Fusgen, I and Hauri, D. (2001). New aspects of therapy with tropsium chloride for urge incontinence. *Eur J Geriatrics,* 3(1), pp. 41-5.